ANALYSIS AND COMMENTARY

Supporting Life in the Soil—The Foundation of an Organic System

Hydroponic production defies the foundational organic principle of "feed the soil, not the plant"

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The organic industry is at a crossroads. After experiencing 20 years of exponential growth under a rigorous law, the *Organic Foods Production Act* (OFPA) *of 1990*, the oversight by a stakeholder board, the National Organic Standards Board (NOSB), and a transparent public engagement process, elements of organic standards are eroding in ways that tarnish the values, principles, and standards of organic. The decision to allow organic labeling of hydroponic food production by the National Organic Program (NOP) at the U.S. Department of Agriculture, which the NOSB failed to repudiate, is a turning point because it defies the principles of organic production embedded in the history of organic and the law.

Hydroponics may have value, but its soil-less medium and dependence on a soluble synthetic food source defy organic principles. At the same time, the intent of Congress is defied by the erosion of the NOSB process of sunsetting—or automatically removing on a five-year cycle— synthetic materials on the *National List of Allowed and Prohibited Substances,* unless reinstated after a rigorous reassessment. This happens as the industry and its major trade group, the Organic Trade Association, is unable or unwilling to stop this trend, which many of its members view as great for the growth of the industry. Advocates, like Beyond Pesticides, and its project OrganicEye, and some in the industry see the hydroponic and sunset decisions as undermining organic integrity and long-term growth. The battle lines between adherence to organic standards and an eroding of those standards have become increasingly clear over the last decade.

The question is whether consumers, environmentalists, farmers, and industry allies will be able to protect the organic label and the law. What is at stake in this battle is not just the label and the law, but a form of agriculture and food production that confronts the major public health and environmental threats to life—climate crisis and biodiversity decline and the insect apocalypse— through the elimination of petroleum-based synthetic chemicals and the sequestration of carbon in land management. A massive and urgent transition is needed to truly organic practices if we have a chance at a livable future. This transformation requires consumer support of organic and a belief in its integrity in the marketplace, which includes paying a higher price at grocery checkout to save the future. It should be noted that the cost of chemical-intensive agriculture with the impact of pollution cleanup, industrial chemical plant accidents, lower IQ in children exposed to pesticides, and more is all borne by consumers (taxpayers).

What follows is an explanation of one of the many ways the present NOP policy regarding hydroponic and some other container crop production systems has, since the adoption of the final organic rule in 2000, strayed from the foundational principles of organic farming.

BACKGROUND

"Feed the Soil, Not the Plant" is the mantra of organic farming. The early definitions of organic farming reflect this. For example, the definition and subsequent discussion of organic farming in Rodale's *Encyclopedia of Organic Gardening* says that "organic gardening is a system where fertile soil is maintained by applying nature's own law of replenishing it. . ." The long discussion of organic farming, organic matter and organic methods here, and in all the other masterful publications about organic farming of the mid-twentieth century, go into detail about how the system is centered on providing food for the microorganisms and all the other critters in the soil. It is their decomposition of this food (organic matter) that provides the mineral nutrients that plants need to grow.

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ORGANIC REGULATIONS

Organic regulations began in the 1970s by private, usually nonprofit, organizations. The 2000 federal organic rule and these early production guidelines for organic farming are similar in requiring the feeding of the soil instead of feeding the plant. The heart of the early guidelines was that slow release sources of minerals and organic matter must be added to the soil through crop rotation with green manures (nitrogen fixing cover crops or intercropping), livestock manures, compost, etc.

SOIL BUILDING STANDARDS IN THE ORGANIC FOODS PRODUCTION ACT (OFPA)

Hydroponic and growing in containers are inconsistent with the following:

- OFPA §6513(b) An organic plan shall contain provisions designed to foster soil fertility, primarily through the management of the organic content of the soil through proper tillage, crop rotation, and manuring.

- §6517 (b) Content of list. The list established under subsection (a) shall contain an itemization, by specific use or application, of each synthetic substance permitted under subsection (c)(1) or each natural substance prohibited under subsection (c)(2).

- §6517(c)(1) Exemption for prohibited substances in organic production and handling operations. The National List may provide for the use of substances in an organic farming or handling operation that are otherwise prohibited under this chapter only if—
  - (A) the Secretary determines, in consultation with the Secretary of Health and Human Services and the Administrator of the Environmental Protection Agency, that the use of such substances—
    - (i) would not be harmful to human health or the environment;
    - (ii) is necessary to the production or handling of the agricultural product because of the unavailability of wholly natural substitute products; and
    - (iii) is consistent with organic farming and handling;

NOP followed OFPA and the original certifiers insistence on soil management in the Final Rule. Sections 205.203 (a), (b) and (c) say that the producer "must . . . maintain or improve the physical, chemical, and biological condition of soil," "must manage crop nutrients and soil fertility through rotations, cover crops and application of plant and animal materials," and "must manage plant and animal materials to maintain or improve soil organic matter. . ."

SUBSTANCES OF HIGH SOLUBILITY ARE ALLOWED, BUT REGULATED

Substances of high solubility, i.e., those materials that provide nutrients directly to the plant because they are quickly taken up into the plant with the soil solution, have always been allowed. However, these materials are counter to foundational organic principles, so they have always been strictly regulated. The early certification agencies allowed them, but limited their use. OFPA leaves a place for them, but requires that soil management be the heart of organic production. The final rule allows them, BUT limits their use to essentially rescue treatments of a soil that otherwise is managed by methods consistent with organic principles. NOP put such materials into 205.602—Nonsynthetic substances prohibited for use in Organic Crop Production: 1) Calcium chloride is limited to treating a physiological disorder; 2) Potassium chloride must be used in a manner that minimizes chloride accumulation in the soil; 3) Sodium nitrate is restricted to no more than 20% of the crop's total nitrogen requirement. [The NOSB recommended prohibiting sodium nitrate in 2011.]

NOP FINAL RULE REGULATES HIGH SOLUBILITY SUBSTANCES

The preamble to the final rule says, "Based on the recommendation of the NOSB, the final rule would prohibit use of these [high solubility] materials, unless the NOSB developed recommendations on conditions for their use and the Secretary added them to the National List." At the time, the discussion focused on mined substances of high solubility, because concentrated, highly soluble plant nutrient materials other than mined sources were not available. The new materials of high solubility that are now used (especially in hydroponic and some other types of container production) require regulation that ensures that the foundational principle of organic production is upheld—feed the soil, not the plant.

CONCLUSION

Advocates of organic, integral to the history and focus on supporting soil biology and biodiversity, are seeking to ensure adherence to the values, principles, and practices that grew the sector to exponential growth and will support its continued expansion. To sustain life, the future urgently requires a transformation of mainstream chemical-intensive agriculture to organic, with consumers, environmentalists, farmers, and industry allies joining together to effect the changes necessary.

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